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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference F172222 | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US03/22501 | International filing date (day/month/year) 08 August 2003 (08.08.2003) | Priority date (day/month/year) 08 August 2002 (08.08.2002) |
| International Patent Classification (IPC) or national classification and IPC IPC(7): A42B 3/00 and US Cl.: 2/411 | | |
| Applicant SCHNEIDER, MARC S. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

| | |
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| Date of submission of the demand 23 February 2004 (23.02.2004) | Date of completion of this report 21 November 2004 (21.11.2004) |
| Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230 | Authorized officer <i>Sharon A. Greene for</i> Rodney M. Lindsey Telephone No. (703) 872-9301 |

Form PCT/IPEA/409 (cover sheet)(July 1998)

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I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description:
 pages 1-24 as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.
- ☒ the claims:
 pages 27 and 29, as originally filed
 pages 25, 26 and 28, as amended (together with any statement) under Article 19
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.
- ☒ the drawings:
 pages 1-8, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.
- ☐ the sequence listing part of the description:
 pages NONE, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. STATEMENT**

| | | |
|-------------------------------|--------------------|-----|
| Novelty (N) | Claims <u>1-22</u> | YES |
| | Claims <u>NONE</u> | NO |
| Inventive Step (IS) | Claims <u>NONE</u> | YES |
| | Claims <u>1-22</u> | NO |
| Industrial Applicability (IA) | Claims <u>1-22</u> | YES |
| | Claims <u>NONE</u> | NO |

2. CITATIONS AND EXPLANATIONS

Please See Continuation Sheet

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

V. 2. Citations and Explanations:

Claims 1,2,4,5,7,8,10,13-15,17-20 and 22 lack an inventive step under PCT Article 33(3) as being obvious over Strohm in view of Dennis et al. With respect to claims 1, 4, 8 and 19 Strohm shows a helmet shell 10 with lateral members or sides and energy absorbing protective liners/pads as at 18, 19, 23 and as at 15, 16, 26 each with surface impregnation of a waterproofing material 27 and with a surface facing the interior surface of the helmet shell lacking the waterproofing material 27. Strohm does not teach the liner comprising a slow recovery viscoelastic material. Dennis et al. teach old to form an energy absorbing protective liner as at 16 of a slow recovery viscoelastic material. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the slow recovery viscoelastic material of Dennis et al. for that of the liner of Strohm to achieve an alternative means of absorbing a shock to the helmet. With respect to claims 2, 5, 15 and 20 note such teaching by Dennis et al. per paragraph [0024]. With respect to claims 7 and 22 note Figure 2 of Strohm and the different sizes of the pads. With respect to claims 8 and 19 Strohm's teaching of a plastic shell is seen to meet the use of a thermoplastic shell with thermoplastic being encompassed by the term plastic. With respect to product-by-process claim 10, although subject matter is set forth in terms of how it is made, injection molding, claim 10 is still a product claim and it is the patentability of the product and not the process step of injection molding which must be determined. The plastic shell of the helmet of Strohm is seen to teach all the structure of the product claimed. With respect to claim 13 inherently the lateral members or sides of the helmet of Strohm disperse impact force as claimed as a result of the one piece construction of the shell 10. With respect to claim 14 the exact percentage of the impact force dispersed by the shell would have been considered an obvious matter of choice and design to one of ordinary skill in the art at the time of the invention since all that would have been required is that the percentage be attainable with the particular helmet structure. With respect to claim 17 note the upper and lower side portions of the shell of Strohm separated by the channel defined by 13, the side portions being equivalent to the upper and lower lateral members as claimed. With respect to claim 18 the lower edge of the lower side of the shell is equivalent to a strap attachment member as claimed.

Claims 3,6,16 and 21 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Fay. Strohm does not teach silicone as the waterproofing material 27. Fay teaches old the use of silicone (see column 5, lines 53-61) to waterproof helmet liners (see column 8, line 12). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute the silicone of Fay for the material 27 of Strohm to achieve a like result of waterproofing the energy absorbing material.

Claim 9 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph and further in view of Dera et al. Strohm does not teach the shell having a thickness of at least 2 millimeters. Dera et al. teach old in the formation of a helmet shell a thickness of 2.5 to 4.5 millimeters. It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the helmet of Strohm by providing the shell with a thickness in the order of 2.5 to 4.5 millimeters in the manner of Dera et al. to achieve the advantage of a suitable thickness to protect against impact forces.

Claim 11 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

and further in view of Johnson. Strohm does not teach glass fiber for the plastic shell. Johnson teaches old the use of glass fibers in forming a shell (see column 1, lines 17-24). It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the helmet of Strohm by providing the shell, with the glass fibers of Johnson to achieve the advantage of reinforcing the shell.

Claim 12 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph and further in view of Schneider et al. Strohm does not teach the lateral members being thicker than other portions of the helmet shell. Schneider et al. teach old to make lateral or side members defined by section 20 thicker than other portions of the shell. It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the helmet of Strohm by forming the lateral or side members thicker than other portions of the shell to achieve the advantage of enhancing the protection against impact forces afforded by the lateral members.

Claims 1-22 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

CLAIMS

What is claimed is:

1. A helmet for cushioning a head during a sudden impact, comprising:
a helmet shell; and
an energy absorbing protective liner fitted to an interior surface of the helmet shell, wherein the energy absorbing protective liner comprises a slow recovery viscoelastic material with a surface impregnation of a waterproofing material and wherein a surface of the energy absorbing protective liner facing the interior surface of the helmet shell lacks the waterproofing material.

2. The helmet according to claim 1, wherein the slow recovery viscoelastic material is slow recovery viscoelastic polyurethane foam.

3. The helmet according to claim 1, wherein the waterproofing material is silicone.

4. A helmet for cushioning a head during a sudden impact, comprising:
a helmet shell; and
a plurality of energy absorbing protective pads arranged on an interior surface of the helmet shell, wherein each of the energy absorbing protective pads comprises a slow recovery viscoelastic material with a surface impregnation of a waterproofing material and wherein a surface of each of the energy absorbing protective pads facing the interior surface of the helmet shell lacks the waterproofing material.

5. The helmet according to claim 4, wherein the slow recovery viscoelastic material is slow recovery viscoelastic polyurethane foam.
6. The helmet according to claim 4, wherein the waterproofing material is silicone.
7. The helmet according to claim 4, wherein the plurality of energy absorbing protective pads are shaped into pads of variable thickness and size.
8. A helmet for cushioning a head during a sudden impact, comprising:
a helmet shell comprising a thermoplastic shell having a humanoid head shape, and lateral members at least partially disposed around a circumference of a central portion of the thermoplastic shell; and
an energy absorbing protective liner fitted to an interior surface of the helmet shell, wherein the energy absorbing protective liner comprises a slow recovery viscoelastic material with a surface impregnation of a waterproofing material and wherein a surface of the energy absorbing protective liner facing the interior surface of the helmet shell lacks the waterproofing material.
9. The helmet according to claim 8, wherein the helmet shell has a thickness of at least 2 millimeters.

17. The helmet according to claim 8, wherein each of the lateral members disposed around a circumference of the helmet shell is comprised of an upper lateral member and a lower lateral member, and the upper lateral member and the lower lateral member are separated by a lateral channel.

18. The helmet according to claim 17, wherein the helmet shell further comprises a strap attachment member, and the lower lateral member is angled towards the location where the strap attachment member is disposed on the helmet shell.

19. A helmet for cushioning a head during a sudden impact, comprising:

a helmet shell comprising a thermoplastic shell having a humanoid head shape, and lateral members disposed around a circumference of a central portion of the thermoplastic shell; and

a plurality of energy absorbing protective pads arranged on an interior surface of the helmet shell, wherein each of the energy absorbing protective pads comprises a slow recovery viscoelastic material with a surface impregnation of a waterproofing material and wherein a surface of each of the energy absorbing protective pads facing the interior surface of the helmet shell lacks the waterproofing material.

20. The helmet according to claim 19, wherein the slow recovery viscoelastic material is slow recovery viscoelastic polyurethane foam.